

REMARKS

This amendment is in response to the Office Action of September 6, 2002. Reconsideration of claims 1-19 is respectfully requested.

The Office Action

Claims 1-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by Wang, et al. (U.S. Patent No. 5,905,116).

The Claims Distinguish over the Reference of Record

Claim 1 now calls for a process for forming an extended polyalkylene-grafted interpolymer or gel. A maleic anhydride polymer and a maleated polyalkylene are mixed in a mixer. A diamine is added to the blend in the mixer and allowed to react. The polyalkylene-grafted interpolymer formed is allowed to cool in the mixer and, without removing the interpolymer from the mixer, an extender is added to provide the extended polyalkylene-grafted interpolymer.

The Wang, et al. (U.S. Patent No. 5,905,116) reference discloses a method for preparing a centipede grafted polymer. However, the process involves multiple steps. Each time the material is returned to the reactor, it has to be reground and brought to processing temperature, resulting in a fairly time consuming process. There is no suggestion in Wang of using a single batch process in which the reaction product remains in the mixer until the extender is added.

It has been found that by using a high shear mixer, such as an ME-15-SI or DS3-10 mixer, processing steps can be carried out sequentially in the mixer, without the need for removing, cooling, regrinding, and returning the reaction product of one step to the mixer for performing the next step. By allowing the reaction product to cool in the mixer to a sufficient temperature at which the extender can be added, the step involving extensive regrinding and remelting of the product is avoided.

Accordingly, it is submitted that claim 1, and claims 2-12 dependent therefrom, distinguish patentably and unobviously over the reference of record.

Claim 13 now calls for a single batch process for preparing a polymer composition which includes a polyalkylene-grafted interpolymer. The process includes



forming a maleimide interpolymers in a mixing vessel and, without removing the product from the mixing vessel, adding maleated polyalkylene and then mixing from about 0.1 to about 10 weight % of a diamine with the maleimide interpolymers and maleated polyalkylene in the mixing vessel to form a polyalkylene-grafted interpolymers. Without removing the product from the vessel, the polyalkylene-grafted interpolymers is cooled in the mixer to a temperature at which an extender is stable in the polyalkylene-grafted interpolymers, and the extender is added to the mixer.

Wang does not disclose mixing diamine with a maleimide interpolymers formed in a mixer, without removing the interpolymers from the mixing vessel. Nor does Wang disclose adding an extender without removing the grafted product from the mixer. Conventionally, the interpolymers forming step is carried out in a separate, open vessel and the product has to be reground and melted before the next step can be performed. By using a high shear mixer, it has been found that both the forming step, and subsequent steps, can be carried out in the mixer without the need for intermediate cooling and regrinding steps.

Accordingly, it is submitted that claim 13, and claims 14-19 dependent therefrom, distinguish patentably and unobviously over the references of record.

CONCLUSION

For the reasons set forth above, it is submitted that claims 1-19 distinguish patentably and unobviously over the references of record. An early allowance of these claims is earnestly solicited.

Respectfully Submitted,

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VERSION OF CLAIMS WITH MARKINGS TO SHOW CHANGES

Please amend claims 1, 2, and 13, as follows:

1. (Amended) A process for forming an extended polyalkylene-grafted interpolymer or gel, comprising:

a) in a mixer, mixing

1) a polymer comprising mer units derived from maleic anhydride and mer units derived from at least one of

(A) a vinyl aromatic monomer, and

(B) an $R^1(R^2)$ ethylene monomer in which R^1 and R^2 independently are selected from H and substituted or unsubstituted C_1 - C_{20} alkyl or alkoxy groups, and

2) a maleated polyalkylene, so as to form a blend;

b) in said mixer, adding to said blend [adding] a diamine and allowing it to react with the mer units derived from maleic anhydride and with the maleated polyalkylene to form a polyalkylene grafted interpolymer; and

c) allowing the polyalkylene-grafted interpolymer to cool in said mixer and, without removing the interpolymer from the mixer, adding an extender to provide said extended polyalkylene-grafted interpolymer; and

d) optionally, extruding the extended polyalkylene-grafted interpolymer to form a gel having a $\tan \delta$ of at least 0.3.

2. (Amended) The process of claim 1 wherein step a) includes mixing from about 50 to about 99 weight % of said polymer and from about 1 to about 50 weight % of said maleated polyalkylene and wherein step b) includes adding from about 0.1 to about 10 weight % of said diamine.

13. (Amended) A single batch process for preparing a polymer composition which includes a polyalkylene-grafted interpolymer, said process comprising:

a) forming a maleimide interpolymer in a mixing vessel by reacting an amine with a portion of maleic anhydride-derived mer units of an interpolymer

- 5 comprising maleic anhydride-derived mer units and at least one of
- 1) vinyl aromatic-derived mer units, and
 - 2) $R^1(R^2)$ ethylene-derived mer units in which R^1 and R^2 independently
- are H or substituted or unsubstituted C_1 to C_{20} alkyl groups or alkoxyl groups;
- 10 b) without removing the product of step a) from the mixing vessel, adding sufficient maleated polyalkylene such that the mixing vessel contains from about 1 to about 50 weight percent maleated polyalkylene and from about 50 to about 99 weight percent maleimide interpolymer;
- c) mixing from about 0.1 to about 10 weight % of a diamine with the maleimide interpolymer and maleated polyalkylene in the mixing vessel
- 15 to form said polyalkylene-grafted interpolymer; and
- d) [optionally,] without removing the product of step c) from the vessel, cooling the polyalkylene-grafted interpolymer in the mixer to a temperature at which an extender is stable in the polyalkylene-grafted interpolymer, and adding an extender to the mixer.
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